Claims:

1. A method for storing and transferring containers, comprising the steps of:

a container information-receiving step for receiving information of the containers transmitted from a loading/unloading unit while the containers stacked in the container ship are unloaded by means of the loading/unloading unit;

a transferring unit-moving step for moving a transferring unit to the loading/unloading unit having transmitted the information of the containers so that the containers are loaded onto the transferring unit;

a storage-determining step for analyzing the received information of the containers to determine whether the containers placed on the transferring unit are to be moved to a stacking unit so that the containers can be stored or are to be moved to a taking-in/taking-out unit so that the containers can be removed from a container terminal; and

a container-transferring step for moving the transferring unit to a position selected on the basis of the determination as to whether the containers are to be stored or not so that the containers can be transferred.

2. The method as set forth in claim 1, further

comprising the steps of:

a stacking position-selecting step for selecting a position on the stacking unit where the containers are to be stacked after storage of the containers is selected at the storage-determining step.

3. The method as set forth in claim 1, further comprising the steps of:

a shortest route-selecting step for analyzing and selecting the shortest route among various routes along which the loading/unloading unit can be moved to the selected position on the basis of the determination as to whether the containers are to be stored or not at the storage-determining step, and

wherein the shortest route-selecting step is carried out after the storage-determining step.

4. The method as set forth in claim 1, wherein the transferring unit placed at the shortest distance from the loading/unloading unit is selected in the transferring unit-moving step.

5. The method as set forth in claim 2, wherein the position on the stacking unit is selected on the basis of the lengths of the unloaded containers and depending upon

when the containers are removed in the stacking position-selecting step.

6. The method as set forth in claim 5, wherein the containers are stacked on different stacking units on the basis of the lengths of the containers, and containers necessary to be removed first are stacked such that the containers are closer to the taking-in/taking-out unit than containers necessary to be removed later.

7. The method as set forth in any one of claims 1 to 6, wherein the control of the transferring unit is achieved in a wireless transmitting and receiving fashion.

8. A method for storing and transferring containers, comprising the steps of:

a container information-receiving step for receiving information of containers to be loaded onto a container ship from a loading/unloading unit;

a container position-identifying step for identifying the position of the containers on the basis of the received information of the containers;

a transferring unit-moving step for moving a transferring unit to the identified position so that the containers can be loaded onto the transferring unit; and

a container-loading step for moving the transferring unit having the containers placed thereon to the loading/unloading unit so that the containers can be loaded onto the container ship.

9. The method as set forth in claim 8, wherein the transferring unit placed at the shortest distance from the place corresponding to the position of the containers is selected in the transferring unit-moving step.

10. The method as set forth in claim 8 or 9, further comprising the steps of:

a shortest route-selecting step for analyzing and selecting the shortest route among various routes along which the transferring unit can be moved from the place corresponding to the position of the containers to the loading/unloading unit, and

wherein the shortest route-selecting step is carried out after the transferring unit-moving step.

11. An apparatus for storing and transferring containers, comprising:

a loading/unloading unit for loading or unloading containers onto or from a container ship;

a stacking unit for stacking the containers unloaded

from the container ship by means of the loading/unloading unit and containers taken to a container terminal;

a transferring unit for transferring the containers between the loading/unloading unit and the stacking unit; and

a central controlling unit for receiving information of the containers to be loaded onto or unloaded from the container ship from the loading/unloading unit to determine whether the containers are stacked or not and to identify the position of the containers and controlling the movement of the transferring unit so that the containers can be handled.

12. The apparatus as set forth in claim 11, further comprising:

a taking-in/taking-out unit for taking the containers to the container terminal or removing the container out of the container terminal, and

wherein the transferring unit is moved to the taking-in/taking-out unit through the stacking unit.

13. The apparatus as set forth in claim 11 or 12, wherein the transferring unit comprises:

a railroad line connected between the lower part of the loading/unloading unit and the taking-in/taking-out unit via

the stacking unit; and

a plurality of automatic bogies movable automatically along the railroad line.

14. The apparatus as set forth in claim 13, wherein the railroad line comprises:

a plurality of transverse railroad line parts disposed at the lower part of the loading/unloading unit while being perpendicular to the loading/unloading unit;

cross railroad line parts crossing each other, the cross railroad line parts being connected to the transverse railroad line parts in pairs and arranged from the transverse railroad line parts to the stacking unit; and

convergent railroad parts extending from the ends of the cross railroad line parts such that the convergent railroad parts are convergent to at least one position through the stacking unit.

15. The apparatus as set forth in claim 14, further comprising:

railroad line-rotating parts disposed at the section where the cross railroad line parts cross each other and at the section where the convergent railroad parts are convergent.

16. The apparatus as set forth in claim 15, wherein each of the railroad line-rotating parts comprises:

a circular table disposed at the section where the cross railroad line parts cross each other and at the section where the convergent railroad parts are convergent, the circular table having connection railroad line parts disposed on the upper surface thereof, the connection railroad line parts being connected to the cross railroad line parts and the convergent railroad parts;

a rotary shaft mounted to the center of the lower surface of the circular table;

a base for rotatably supporting the lower end of the rotary shaft; and

a rotary driving part electrically connected to the central controlling unit for rotating the circular table.

17. The apparatus as set forth in claim 16, wherein an annular supporting protrusion is attached to the lower surface of the circular table such that the supporting protrusion is disposed around the rotary shaft while being spaced apart from the rotary shaft, and wherein a plurality of supporting rollers are rotatably attached to the lower surface of the supporting protrusions.

18. The apparatus as set forth in claim 14, wherein

the taking-in/taking-out unit comprises:

a loader for loading the container moved by means of the automatic bogie above the section where the convergent railroad parts are convergent according to the control of the central controlling unit onto a trailer.

19. The apparatus as set forth in claim 18, wherein the loader comprises:

a loader frame mounted above the convergent ends of the convergent railroad parts;

a moving bogie movable along the loader frame;

a plurality of holder parts attached to the moving bogie for holding the container; and

a loader driving part electrically connected to the central controlling unit for driving the moving bogie.

20. The apparatus as set forth in claim 14, wherein the automatic bogie comprises:

a rectangular frame-shaped bogie body;

a plurality of bogie shafts rotatably mounted to the lower part of the bogie body;

bogie wheels securely fixed to both ends of each of the bogie shafts;

bogie driving parts for driving the bogie shafts;

a bogie control part for controlling one of the bogie

driving parts; and

a wireless transceiver electrically connected to the bogie control part for performing a wireless transmitting and receiving operation with the central controlling unit.

21. The apparatus as set forth in claim 20, wherein the bogie body is provided at the upper surface thereof with a plurality of fixing protrusions such that the fixing protrusions can be securely inserted into the corner areas of a large-sized container placed on the upper surface of the automatic bogie.

22. The apparatus as set forth in claim 20, wherein the bogie body is provided with rechargeable batteries for supplying electric current to the bogie driving parts, respectively.

23. The apparatus as set forth in claim 11, wherein the stacking unit comprises:

a steel-frame body constructed in a vertical multi-storied structure such that the steel-frame body has a plurality of stacking chambers defined therein, the steel-frame body having horizontal rails disposed at both sides in each stacking chamber and a lifting channel defined vertically in the steel-frame body;

a cage disposed in the lifting channel, the cage having horizontal rails corresponding to the horizontal rails of the stacking chamber;

a traveler mounted in the cage such that the traveler can be attached to or detached from the upper part of the container, the traveler being movable horizontally along the horizontal rails of the stacking chamber and the horizontal rails of the cage; and

lifting parts attached to the upper end of the steel-frame body for moving the cage upward or downward along the lifting channel.

24. The apparatus as set forth in claim 23, wherein the traveler comprises:

a horizontal driving part including a main body disposed at the cage, and a plurality of driving rollers rotatably disposed at both sides of the main body such that the driving rollers are moved along the horizontal rails of the cage while being in rolling contact with the horizontal rails of the cage by means of a driving motor fixed to the main body; and

holder parts formed at the lower surface of the main body such that the holder parts can be engaged in or disengaged from holes formed at the upper surface of the container.

25. The apparatus as set forth in claim 23 or 24, wherein the stacking unit further comprises:

locking parts for locking the cage to the steel-frame body at the position where the horizontal rails of the stacking chamber are level with the horizontal rails of the cage.

26. The apparatus as set forth in claim 25, wherein each of the lifting parts comprises:

a hydraulic motor mounted to the upper end of the steel-frame body;

a driving pulley that can be operated by means of the hydraulic motor; and

wire ropes connected to the cage such that the wire ropes can be wound by means of the driving pulley.

27. The apparatus as set forth in claim 26, wherein a plurality of guide rails are vertically disposed along the lifting channel, and a plurality of rollers are rotatably attached to the outside of the cage such that the rollers can be in contact with the guide rails.

28. The apparatus as set forth in claim 25, wherein each of the lifting parts comprises:

a lower fixed cylinder having an open lower end, the

lower fixed cylinder being provided at the upper part thereof with a first upper inlet;

a lower actuating rod inserted in the lower fixed cylinder through the upper part of the lower fixed cylinder, the lower actuating rod having a first central channel and a first internal channel defined therein, the first central channel having open upper and lower ends and the first internal channel having upper and lower ends closed by means of a first upper flange and a first piston, the lower actuating rod having a first lower inlet and a first upper outlet formed at the upper and lower parts of the first internal channel, respectively;

a first external channel defined between the lower actuating rod and the lower fixed cylinder for communicating with the first upper inlet of the lower fixed cylinder and the first lower inlet of the lower actuating rod;

an upper moving cylinder formed integrally to the upper part of the first upper flange, the upper moving cylinder having an open lower end for communicating with the lower actuating rod, the upper moving cylinder having a second upper inlet formed at the upper part thereof;

an upper actuating rod inserted in the upper moving cylinder through the upper part of the upper moving cylinder, the upper actuating rod having a second central channel and a second internal channel defined therein, the

second central channel having an open lower end and an upper end closed by means of a second upper flange and the second internal channel having upper and lower ends closed by means of the second upper flange and a second piston, the upper actuating rod having a second lower inlet and a second closed upper outlet formed at the upper and lower parts of the second internal channel, respectively, the upper actuating rod being connected to the cage;

a second external channel defined between the upper actuating rod and the upper moving cylinder for communicating with the second upper inlet of the upper moving cylinder and the second lower inlet of the upper actuating rod;

a first supply pipe having one end connected to the first upper inlet of the lower fixed cylinder and the other end connected to an external fluid tank including a hydraulic pump; and

a second supply pipe having one end connected to the first upper outlet of the lower actuating rod and the other end connected to the second upper inlet of the upper moving cylinder.

29. The apparatus as set forth in claim 28, wherein the first supply pipe, the second supply pipe, the first internal channel of the lower actuating rod, and the second

internal channel of the upper actuating rod are constructed such that the amount of fluid supplied through the first supply pipe and the second supply pipe is equal to the amount of fluid supplied through the first internal channel of the lower actuating rod and the second internal channel of the upper actuating rod.

30. The apparatus as set forth in claim 28, wherein

the end of a first upper stopper of the lower fixed cylinder extends downward such that the end of the first upper stopper of the lower fixed cylinder blocks approximately the upper half of the first upper inlet of the lower fixed cylinder,

the end of a second upper stopper of the upper moving cylinder extends downward such that the end of the second upper stopper of the upper moving cylinder blocks approximately the upper half of the second upper inlet of the upper moving cylinder,

the first piston of the lower actuating rod is spaced from the lower end of the lower fixed cylinder by a distance corresponding to approximately the lower half of the first upper inlet of the lower fixed cylinder, and

the second piston of the upper actuating rod is spaced from the lower end of the upper moving cylinder by a distance corresponding to approximately the lower half of

the second upper inlet of the upper moving cylinder.

31. The apparatus as set forth in claim 28, wherein a driving pulley is attached to the upper surface of the second upper flange, a wire rope wound on the driving pulley is connected to the cage, and guide rollers are mounted to one side of the driving pulley such that the guide rollers can be moved along the guide rails vertically disposed at the lifting channel while being in rolling contact with the guide rails, the guide rollers being arranged in pairs in an upper and lower arrangement.

32. The apparatus as set forth in claim 25, wherein each of the locking parts comprises:

a movable locking part including an actuating cylinder mounted to the cage and an insertion rod integrally attached to the end of a piston rod of the actuating cylinder such that the insertion rod can be moved forward from or backward to the cage by means of the actuating cylinder; and

a locking insertion part formed at the steel-frame body corresponding to the stacking chamber for securely locking the insertion rod.

33. The apparatus as set forth in claim 32, wherein the locking insertion part comprises:

a locking member attached to the upper end of the stacking chamber corresponding to the lifting channel; and

an insertion hole formed at the locking member for allowing the insertion rod to be inserted therethrough.

34. The apparatus as set forth in claim 32, wherein the locking insertion part comprises:

a guide locking member attached to the upper end of the stacking chamber corresponding to the lifting channel; and

a wedge-shaped groove formed at the guide locking member such that the insertion rod can be inserted into the wedge-shaped groove while being guided along the wedge-shaped groove.

35. The apparatus as set forth in claim 33, wherein the insertion hole is a vertically extending elongated hole, the width of the insertion hole being gradually increased from the lower end to the upper end of the insertion hole such that the width of the hole at the upper end of the insertion hole is larger than the diameter of the insertion rod.

36. The apparatus as set forth in claim 34, wherein a roller is rotatably attached to the end of the insertion rod

such that the insertion rod can be smoothly guided along the wedge-shaped groove while being in rolling contact with the wedge-shaped groove by means of the roller.

37. The apparatus as set forth in claim 33 or 34, wherein the movable locking part further comprises:

a sliding tube surrounding the insertion rod such that the insertion rod can be slid through the sliding tube; and

a supporting bar attached between the sliding tube and the cage.

38. The apparatus as set forth in claim 23 or 24, wherein the stacking unit further comprises:

height-adjusting parts, each of the height-adjusting parts comprising:

a hydraulic cylinder mounted downward at a corresponding corner of the traveler; and

a spreader, having a corresponding holder part, mounted to the end of the piston rod of the hydraulic cylinder such that the spreader is moved upward or downward by means of the hydraulic cylinder and the height of the holder part is adjusted according to the movement of the spreader.

39. The apparatus as set forth in claim 38, wherein

each of the height-adjusting parts comprises:

a guide rod disposed at one side of the hydraulic cylinder, the guide rod being attached to the spreader through the traveler.

40. The apparatus as set forth in claim 39, wherein each of the height-adjusting parts comprises:

a stopper attached to the traveler such that the stopper can be caught in a catching groove formed at the upper end of the guide rod for holding the guide rod.

41. The apparatus as set forth in claim 40, wherein the stopper comprises:

a stopper plate disposed at the upper surface of the traveler, the stopper plate having engaging grooves formed at both ends thereof such that the engaging grooves can be simultaneously engaged with the corresponding catching grooves of a pair of guide rods; and

a stopper hydraulic cylinder disposed below the stopper plate for moving the stopper plate to one side.

42. The apparatus as set forth in claim 41, wherein the stopper further comprises:

a pair of distance-adjusting holes formed at the stopper plate while being spaced apart from each other; and

a pair of adjusting bars mounted to the upper surface of the traveler such that the adjusting bars are inserted in the distance-adjusting holes, respectively, for adjusting the movable distance of the stopper plate.

43. The apparatus as set forth in claim 42, wherein the traveler is provided with a guide tube surrounding the guide rod.

44. The apparatus as set forth in claim 23 or 24,

wherein the stacking unit comprises: a steel-frame stacking facility including a plurality of steel-frame bodies connected to each other such that floors of one of the steel-frame bodies communicate with floors of the other steel-frame body, respectively, each of steel-frame bodies having at least two stacking chambers disposed along both sides of the lifting channel, and

wherein the traveler is moved horizontally from one of the lifting channels to the other lifting channel in the steel-frame stacking facility.

45. The apparatus as set forth in claim 44, wherein the stacking unit further comprises:

an introduction-preventing part for preventing the traveler provided at one of the lifting channels from being

introduced into the other lifting channel.

46. The apparatus as set forth in claim 44 or 45, wherein the steel-frame stacking facility includes various steel-frame bodies having different sizes so that various containers having different sizes and heights can be stacked.

47. The apparatus as set forth in claim 45, wherein the introduction-preventing part comprises:

safety protrusions attached, in pairs, to the insides of the opposite stacking chambers communicating with each other; and

stop brackets attached, in pairs, to the traveler such that the stop brackets pass by one pair of safety protrusions placed near the traveler and collide against the other pair of safety protrusions placed away from the traveler.

48. The apparatus as set forth in claim 47, wherein each of the safety protrusions is made of rubber so that shocks can be absorbed by means of the safety protrusions.

49. The apparatus as set forth in claim 47, further

comprising:

container-introducing parts disposed at both sides of the steel-frame stacking facility for introducing containers into the lifting channels.

50. The apparatus as set forth in claim 49, wherein each of the container-introducing parts comprises:

introducing rails mounted at the outside of the lower end of each lifting channel;

bogies disposed on the introducing rails such that the bogies can be moved along the introducing rails;

upper rails disposed above the introducing rails while being perpendicular to the introducing rails; and

stacking loaders disposed on the upper rails such that the stacking loaders can be moved along the upper rails for loading containers onto the bogies.

51. The apparatus as set forth in claim 50, wherein each of the stacking loaders comprises:

a moving bogie movable along the upper rails;

a fixing frame disposed below the moving bogie; and

a plurality of holder parts attached to the fixing frame for holding containers having different sizes.

52. An apparatus for storing and transferring

containers including a stacking unit for stacking a great number of containers, wherein the stacking unit comprises:

a steel-frame body constructed in a vertical multi-storied structure such that the steel-frame body has a plurality of stacking chambers defined therein, the steel-frame body having horizontal rails disposed at both sides in each stacking chamber and a lifting channel defined vertically in the steel-frame body;

a cage disposed in the lifting channel, the cage having horizontal rails corresponding to the horizontal rails of the stacking chamber;

a traveler mounted in the cage such that the traveler can be attached to or detached from the upper part of the container, the traveler being movable horizontally along the horizontal rails of the stacking chamber and the horizontal rails of the cage; and

lifting parts attached to the upper end of the steel-frame body for moving the cage upward or downward along the lifting channel.

53. The apparatus as set forth in claim 52, wherein the traveler comprises:

a horizontal driving part including a main body disposed at the cage, and a plurality of driving rollers rotatably disposed at both sides of the main body such that the driving

rollers are moved along the horizontal rails of the cage while being in rolling contact with the horizontal rails of the cage by means of a driving motor fixed to the main body; and

holder parts formed at the lower surface of the main body such that the holder parts can be engaged in or disengaged from holes formed at the upper surface of the container.

54. The apparatus as set forth in claim 52 or 53, wherein the stacking unit further comprises:

locking parts for locking the cage to the steel-frame body at the position where the horizontal rails of the stacking chamber are level with the horizontal rails of the cage, and wherein each of the locking parts comprises:

a movable locking part including an actuating cylinder mounted to the cage and an insertion rod integrally attached to the end of a piston rod of the actuating cylinder such that the insertion rod can be moved forward from or backward to the cage by means of the actuating cylinder; and

a locking insertion part formed at the steel-frame body corresponding to the stacking chamber for securely locking the insertion rod.

55. The apparatus as set forth in claim 52 or 53, wherein the stacking unit further comprises:

height-adjusting parts, each of the height-adjusting parts comprising:

a hydraulic cylinder mounted downward at a corresponding corner of the traveler; and

a spreader, having a corresponding holder part, mounted to the end of the piston rod of the hydraulic cylinder such that the spreader is moved upward or downward by means of the hydraulic cylinder and the height of the holder part is adjusted according to the movement of the spreader.

56. The apparatus as set forth in claim 52 or 53,

wherein the stacking unit comprises: a steel-frame stacking facility including a plurality of steel-frame bodies connected to each other such that floors of one of the steel-frame bodies communicate with floors of the other steel-frame body, respectively, each of steel-frame bodies having at least two stacking chambers disposed along both sides of the lifting channel, and

wherein the traveler is moved horizontally from one of the lifting channels to the other lifting channel in the steel-frame stacking facility.